

# Markus Feuerer

Doctoral dissertation German Cancer Research Center and University of Heidelberg (1998- 2003), Postdoctoral position at Charité – Humboldt University Berlin, and Deutsche Rheuma-Forschungszentrum, Berlin (2003-2004), Postdoctoral position at Joslin Diabetes Center and Department of Pathology, Harvard Medical School, Boston, USA (2004-2009). Since November 2009 head of the Helmholtz Young Investigator research group Immune Tolerance, German Cancer Research Center



## Current Research

The immune system has evolved to preserve both the ability of a host to respond to a foreign invader while preventing reactivity against self. Potentially auto-reactive T cells can escape negative selection in the thymus. While self-reactive T cells represent a risk for autoimmunity, multiple mechanisms operate in the periphery to prevent effective triggering by self-antigen. In contrast, anti-tumor immunotherapy relies on the successful activation of these incompletely deleted self-reactive T cells.

Our interest is to reveal molecular mechanisms underlying peripheral tolerance from dominant suppression to anergy induction. The ability to actively suppress an immune response makes regulatory T (Treg) cells important elements to consider. Treg cells are a specialized lineage of CD4+ T cells that play a key role in the maintenance of peripheral self-tolerance. They are characterized by expression of the transcriptional regulator Foxp3.

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## Future Projects and Goals

Our goal is to explore Treg cell biology in the context of autoimmunity and anti-tumor-immunity. Why are these cells so special? What are the molecules behind? We are also interested in the local microenvironment critically involved in immune regulation, especially the monocyte – macrophage – dendritic cell axis.

## Selected Publications

- 1. Feuerer M**, Shen Y, Littman D, Benoist C, Mathis D. How punctual ablation of Foxp3<sup>+</sup> T cells unleashes an autoimmune lesion within the pancreas islets. *Immunity*. 2009; 31(4):654-64.
- 2. Feuerer M**, Herrero L, Cipolletta D, Naaz A, Wong J, Nayer A, Lee J, Goldfine AB, Benoist C, Shoelson S, Mathis D. Lean, but not obese, fat is enriched for a unique population of regulatory T cells that affect metabolic parameters. *Nature Medicine*. 2009; 15(8):930-9.
- 3. Feuerer M**, Hill JA, Mathis D, Benoist C. Foxp3<sup>+</sup> regulatory T cells: differentiation, specification, subphenotypes. *Nature Immunology* 2009; 10:689-95.
- 4. Feuerer M**, Jiang W, Holler PD, Satpathy A, Campbell C, Bogue M, Mathis D, Benoist C. Enhanced thymic selection of FoxP3<sup>+</sup> regulatory T cells in the NOD mouse model of autoimmune diabetes. *PNAS*. 2007; 104(46):18181-6.
- Hill JA\*, **Feuerer M\***, Tash K, Haxhinasto S, Perez J, Melamed R, Mathis D, Benoist C. Foxp3 transcription-factor-dependent and -independent regulation of the regulatory T cell transcriptional signature. *Immunity*. 2007; 27 :786-800.